STATE OF VERMONT
PUBLIC SERVICE BOARD

Docket No. 7032

Joint Petition of Vermont Electric Power Company, Inc. ("VELCO"), Green Mountain Power Corporation ("GMP") and the Town of Stowe Electric Department ("Stowe") for a Certificate of Public Good pursuant to 30 V.S.A. § 248 authorizing VELCO to upgrade a substation in Moretown, Vermont; construct .3 miles of side by side, single pole tap; construct a switching station in Duxbury, Vermont; construct 9.4 miles of 115 kV transmission line; upgrade an existing GMP 34.5 kV subtransmission line; construct a substation in Stowe, Vermont; and for Stowe to construct 1.05 miles of 34.5 kV subtransmission line in Stowe, Vermont.

DIRECT TESTIMONY OF
J. RILEY ALLEN
ON BEHALF OF THE
VERMONT DEPARTMENT OF PUBLIC SERVICE

April 11, 2005

Summary: The purpose of Mr. Allen's testimony is to present an overview of the Department's case and identify the supporting witnesses in the subject matter areas reviewed. Mr. Allen reviews the project in relation to the statutory criteria that must be met for

approval of the project. Mr. Allen is also the Department's subject matter witness on issues related to the forecast and related issues of need.

Direct Testimony
of
J. Riley Allen

Witness Identification and Qualifications

Q. Please state your name and title.

A. My name is J. Riley Allen and I am the Director of Regulated Utility Planning at the Department of Public Service.

Q. Please describe your education and work experience.

A. I received a B.A. in Economics from the University of Florida and an M.A. in Economics from the University of Virginia.

Over the years I have held many positions with the Department of Public Service including that of Planning Econometrician, Special Counsel for Financial Analysis, Utilities Finance and Economics Analyst, and now the Director of Regulated Utility Planning. I have also employed by the Vermont Public Service Board for seven years as a Utilities Analyst and was employed as a regulatory advisor to various donor agencies on several projects in Southern and Central Africa.

Q. Have you testified before this Board before?

A. Yes. I have testified on many occasions on a variety of issues dating back to the late 1980s.

Summary

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to present the recommendations of the Department and the conclusions reached by the various subject matter experts and to present the broad

conclusions of the Department relating to the proposed upgrade of the Lamoille County Study Area with the VELCO proposed 115 kV transmission lines and related projects, largely on the corridor between Duxbury and Stowe, the Lamoille Country Project ("LCP"). I will also be the Department's witness on the issue of the load forecasts presented by the petitioners in this case. Part I of my testimony will present a summary of the Department's position. Part II of my testimony presents our conclusions in relation to the findings that the Board must make for an application of this sort. Part III of my testimony will present my conclusions with respect to the forecasting issues in relation to §248(b)(2) in relation to the need for the project.

Q. Please describe the Lamoille County Study Area ("LCSA").

A. The LCSA is an area primarily supplied by three VELCO 115 kV to 34.5 kV step-down substations located in Middlesex, East Fairfax and Irasburg. It is also bounded by substations at Barre and Berlin, and the New England Power Company ("NEPCO") Comerford 230 kV substation. The utilities serving the area include Green Mountain Power, the Village of Stowe, Central Vermont Public Service Corporation ("CVPS"), Vermont Electric Cooperative ("VEC"), Washington Electric Cooperative ("WEC"), the Villages of Hyde Park, Johnson, and Morrisville, and the Town of Hardwick.

Q. Please summarize your conclusions and recommendations for the project.

A. In Part I, I outline the Department's case and present its subject matter witnesses. The Department recommends that the project be approved with the modifications proposed by the Department witnesses Raphael and Smith to address aesthetic concerns. Specifically, the Department of Public Service concludes that there is indeed a need for the project, the need can not be satisfied by cost-effective distributed generation and efficiency alternatives, and that the 115 kV option as proposed by VELCO and modified by recommendations of Department witnesses is the preferred least-cost option.

In Part II, I summarize the Department's conclusions in relation to the Section 248

criteria that the Board must apply to this project in its review. We conclude that the proposal satisfies the criteria that the Board must apply.

In Part III, I testify to some features of existing load levels and the load forecast in relation to the concerns over reliability and present my conclusions. I conclude that there is adequate basis for concluding that the LCSA is experiencing and is expected to experience load growth sufficient to warrant the proposed project.

Part I – Department Review

Q. Please characterize the scope and nature of the Department's review.

A. The Department reviewed many aspects of the proposal including the load forecast and potential cost-effective alternatives. The Department reviewed the technical merits of the proposed solution and transmission alternatives considered to assure adequate and reliable service in the Lamoille County Study Area. The Department also reviewed other aspects of the project as they relate to health and safety of the VELCO proposal. The Department considered the costs of the project, allocation of costs to participating utilities, and potential rate impacts of the project on affected utilities. The Department reviewed the proposal from an aesthetic standpoint, and reviewed health concerns around Electro Magnetic Fields (EMF) from the transmission lines and as it relates to the project. The Department reviewed environmental issues including concerns associated with noise.

Q. Please identify each of the Department's witnesses and the scope of his other testimony in this proceeding.

The Department submits prefiled testimony and exhibits by each of the following witnesses:

Witness	**Subject**
J. Riley Allen	I provide a summary of the Department's case and recommendation to the Board based on our examination of the facts. I also serve as the Department's witness on the issue of the load forecast as it relates to the question of need under §248(b)(2).
George E. Smith	Mr. Smith provides a technical evaluation of the petitioner's proposal from the perspective of a transmission engineer and provides his recommendations and conclusions. Mr. Smith addresses §§248(b)(2), (b)(3), (b)(4) and portions of (b)(5).
Carole Welch	Ms. Welch discusses the results of her review of the Petitioners' analysis of energy conservation programs and measures and energy efficiency and load management measures as an alternative or partial alternative to the proposed transmission upgrade. Her review addresses a portion of the transmission project, pursuant to §248(b)(2).
Sean Foley	Mr. Foley addresses the economic benefit of the project, the rate impacts of the project, and the impact of the project on property values pursuant to §248(b)(4).
DOH witnesses White and Crist	Witnesses White and Crist provide testimony that responds to the health issues and concerns associated with EMF from high voltage lines as it relates to §248(b)(5) .
David Rafael	Mr. Raphael addresses aesthetic issues in relation to the proposal and provides recommended changes to the project, pursuant to §248(b)(5).

Q. Please describe the scope and conclusions of the Department review of the proposed transmission project as developed by the petitioners.

A. As I indicated above, the Department supports the proposal with modifications to address certain aesthetic concerns.

Q. Please describe the Department's conclusions in each of the areas studied by the Department.

A. Listed below are the topics covered and a brief summary of our conclusions. The subject matter witness provides further support for the conclusions and each are identified in my testimony.

Load Forecast

As discussed below, the petitioners provide a forecast of coincident peak load for the LCSA that shows growth from a current peak of roughly 74 MW (in the winter of 2004/05), to one that is about 19 MW higher in the next 10 years (in the winter of 2014/15). While I have some concerns with the forecast methods and believe that there are opportunities for controlling the load growth, I conclude that a transmission solution is needed even at existing loads, and that the forecasted loads are not unreasonable. The LCSA region is experiencing significant growth at this time and warrants immediate attention. The forecasts presented are not unreasonable when informed by recent patterns of growth, current plans for development in the Stowe community and the LCSA region, and generally the longer term patterns of development in Stowe and Vermont generally.

Economic Benefit

Mr. Smith and Mr. Foley describe the economic benefits of the proposal to the State of Vermont. Mr. Foley also reviews the rate impacts, a major project in Stowe that will depend on the electricity, the impacts on property values, tax collection, considers the costs and

impacts of unreliable transmission system services, and concludes that the LCP will provide an economic benefit to the state. As Mr. Smith notes in his testimony, the primary benefit of the project to Vermont is in improving network reliability and permitting growth in and around the region for which the project is being designed. The project also reduces peak losses by 4.1 MW based on a 77 MW load that is projected to occur within the next two years.

For rate impacts, Mr. Foley concludes that the proposal will result in an increase in rates to Stowe of approximately 18.6%, although a significant portion of the cost will be borne solely by Stowe Mountain Resort. Others will experience less significant impacts. Mr Foley also testifies to the impacts on other non-petitioning utilities.

Technical Merit, Stability and Reliability, Cost

Mr. Smith recommends that the LCSA transmission and subtransmission network be maintained at levels that assure reliable service to all customers supplied by the area subtransmission system for loss of any single transmission line section or for a loss of a primary supply source to the area, sometimes referred to as an “N - 1" reliability criteria.

Mr. Smith reviews the proposed 115 kV transmission system upgrade from the standpoint of industry best practices and concludes the proposed solution meets the needs, well into the future, for “all-lines-in” service and that the proposed solution provides reliable service, under first contingency conditions, for load levels of up to 98 MW. Specifically, Mr. Smith considers the need for the proposed project in relation to least-cost criteria, system stability and reliability, and in providing an economic benefit to Vermont. Mr. Smith concludes that the analysis and alternatives considered by VELCO in support of the project were robust and that VELCO studied scenarios in detail using industry standard analysis and the best comprehensive system model available. Mr. Smith concludes that the project does indeed meet the standards of least-cost once appropriate modifications have been made to the project.

Mr. Smith proposes alternative structures for a portion of the project. Mr. Smith proposes the use of various modifications to the VELCO proposal where aesthetic

considerations warrant. For example, Mr. Smith believes single pole structures are feasible and desirable for portions of the 115kV and 34.5kV circuits north of the Blush Hill tap. Mr. David Raphael will discuss the aesthetic considerations and offer specific proposals.

Mr. Smith also highlights the operational benefits of the proposal and addresses safety and noise issues associated with the proposal. Mr. Smith concludes that the cost of the project in its current form may be below the estimates presented by VELCO ($16.8 million versus $20.3 million) Finally, Mr. Smith addresses the impacts of the proposal on losses and efficiency, concluding that lower losses will result from the project.

Aesthetic and Related Impacts

Mr. Raphael's testimony addresses whether the Lamoille County Project, as currently proposed, will have undue adverse effect on aesthetics and scenic beauty. Using visual and cartographic analysis, and other forms of review, Mr. Raphael assesses the project's visibility and potential for visual and aesthetic impacts, with a focus on viewsheds from major federal, state or local roads, relationships to nearby areas of public interest, high scenic value and/or official designation as a cultural, aesthetic or recreational facility or resource, road crossings and locations that involve individual residences or residential areas.

Overall, Mr. Raphael concludes that the LCP, as proposed by VELCO and the petitioners, will have an adverse impact on aesthetics that is undue in some locations. For each such location, mitigation measures are recommended and, with such mitigation measures implemented, it can be concluded that the LCP's effect on aesthetics will not be unduly adverse. The Department supports Mr. Raphael's recommendations in all but one area. Mr. Raphael concludes that overhead lines crossing the Waterbury Reservoir, as proposed will not only be adverse, but unduly adverse. Mr. Raphael proposes undergrounding of the line instead. While we acknowledge the conclusion and recommendations of Mr. Raphael, we conclude that the proposed undergrounding imposes an extraordinary cost in proportion to the project and may present an unreasonable burden on ratepayers. We cannot advocate for the

burial of the lines at the reservoir. The roughly $4.1 to $5.9 million in additional costs would be borne disproportionately by a small group of ratepayers.

EMF

Also testifying on behalf of the Department is Carla A. White and Lawrence Crist with the Vermont Department of Health. Ms. White and Mr. Crist address concerns with the potential implications on health from elevated levels of electric and magnetic power frequency field ("EMF") exposure that would result from the VELCO proposal. In summary, they conclude that there are not compelling health reasons requiring modifications to the Lamoille Project related to the concerns over EMF emissions.

DSM and Cost-effective Alternatives

Ms. Welch concludes that while DSM opportunities could have been more vigorously pursued as an alternative to the project, DSM does not provide an adequate alternative to the proposed transmission project. I also conclude that other alternatives such as rate design, curtailment arrangements, and distributed generation have not been adequately explored to their full potential in the region. Nevertheless, I conclude that such opportunities are likely small in relation to the patterns of growth and therefore are not likely to alter the conclusion that the proposed project is needed.

Part II – Section 248 Criteria

Q. Please identify relevant Section 248 criteria and their application to the proposed project and indicate how the Department believes that each criteria is met.

A. I address each in turn below.

§248 (b)(1)

Pursuant to **§248 (b)(1)** the Board is required to find that in-state facilities will not unduly interfere with the orderly development in the region with due consideration having been given to the recommendations of the municipal and regional planning commissions.

Mr. Mace of VELCO describes the interactions with the regional and municipal planning commissions. The Towns of Duxbury, Stowe, and Waterbury and the Lamoille County Regional Planning Commission have sent responses to the Vermont Public Service Board. VELCO has represented that is has made various improvements to the design of the Project in response. Additionally, Mr. Machia of Stowe Electric in his testimony describes the interactions with the Stowe and Regional Planning Commission. Department witness David Raphael also addresses the issue of compliance with community standards and plans in his report and as part of his application of the Quechee test to the project. On this basis, there appears to be adequate reason for concluding that due consideration has been given to orderly development in the region**.**

§248(b)(2)

Pursuant to **§248(b)(2)** the Board is required to find that the proposal will meet the need for present and future demand for service which could not otherwise be met through a more cost effective method.

As I indicate above, both current demands and future growth require that a satisfactory transmission solution be developed. Based on the testimony of Mr. George Smith, together with the testimony of Carole Welch regarding DSM potential, my own analysis of growth in the region and for other alternatives, I conclude that the need exists and that VELCO has, with the modifications included in the proposals of the DPS witnesses, submitted a least cost transmission solutions. I further conclude that it is a need that cannot be satisfactorily be met through the alternatives.

§248(b)(3)

Pursuant to **§248(b)(3)** the Board is required to find that the proposal will not adversely affect system stability and reliability.

The proposal is being presented to the Board to address pre-existing and potential future reliability concerns. The proposal will enhance system stability and reliability and there will be no adverse impact on the same from the project. Mr. Smith is the Department's witness prepared to support this contention.

§248(b)(4)

Pursuant to **§248(b)(4)** the Board is required to find that the proposal will result in an economic benefit to the state and its residents.

Mr. George Smith and Mr. Sean Foley provide support for the conclusion that the proposal will result in an economic benefit to the state. As noted above, the primary benefit of the project to the State is that it will improve the reliability of the network in the LCSA region and allow for planned and expected growth, especially in the Stowe and Waterbury areas.

§248(b)(5)

Pursuant to **§248(b)(5)** the Board is required to find that the proposal will not have an undue adverse effect on aesthetic, historic sites, air and water purity, the natural environment and the public health and safety.

Mr. David Raphael testifies in support of the proposal in relation to certain environmental and aesthetic concerns. Mr. Raphael also considers historical sites and state resources in his review. We also anticipate the Division of Historic Preservation to address historic sites. As VELCO observes, there will be no air emissions resulting from the proposal, except for those associated with short duration construction. Other environmental concerns are addressed in the testimony of Mr. David Raphael. Ms. White and Mr. Crist address health and safety concerns associated with EMF emissions, concluding that there are no compelling health concerns or reasons requiring modifications. Mr. Smith addresses safety issues in

relation to the transmission project. Mr. Smith will also address environmental issues related to noise. He concludes that the concern merits post-construction monitoring to ensure that operating noise will be equal to or below estimated levels.

§248(b)(6)

Pursuant to **§248(b)(6)** the Board is required to find that the investments and construction are consistent with the principles for resource selection expressed in the company's approved least cost integrated plan.

VELCO does not have an approved least cost integrated plan. GMP and Stowe have both offered testimony in support of the project in relation to their approved least cost plans. Based on the testimony of witnesses Ms. Carole Welch, and along with that of VELCO witness Mr. David Grimason, I conclude that the principles of least cost planning have been applied to this project. Based on their testimony and together with that of Mr. George Smith, I conclude that the project meets the principles of least cost planning.

§248(b)(7)

Pursuant to **§248(b)(7)** the Board is required to find that the proposal is in compliance with the electric energy plan approved by the department under section 202 Title 30, or that there exists good cause to permit the proposed action.

I intend to address this issue and that of the request for a 202f determination during the rebuttal phase of this investigation. I believe it is appropriate to consider the evidence of other parties before reaching a conclusion here. Provisionally, I conclude that the proposal is consistent with both the 1994 Electric Plan that was in effect at the time the case was filed and the new 2005 Electric Plan that was adopted after the filing of this proposal.

§248(b)(8)

Pursuant to **§248(b)(8)** the proposal does not involve a transmission facility that has an undue adverse effect on any outstanding resource waters.

Part III – Forecast

Q. Please explain why the load levels and the forecast of load are important to the project.

A. As noted in the testimony of Mr. George Smith, there are two distinct needs for this project. First, the planning analysis of VELCO shows that at existing load levels, the LCSA transmission system is not capable of serving the load and maintaining acceptable voltages following certain contingencies. At a load level above 53 MW, the area would likely suffer a voltage collapse for these contingencies. Load levels above 40 MW are attained over 60% of the hours in any given year, and are attained over 70% of the hours during the winter months. Mr. Smith provides further explanation of the contingencies that can threaten voltage levels.

Second, even with all of the area's subtransmission lines in service, the so-called "all-lines-in" condition, when the area load reaches 74 MW, the present system would be incapable of supplying loads and maintaining voltages above 95% of target voltage levels. At 81 MW load levels, the present system can not maintain voltage levels above 90%.

Q. If existing loads are already above levels that can support normal voltages under standard reliability criteria, why is there any concern about the forecast?

A. Existing load levels already raise fundamental concerns with reliability and do indeed warrant a transmission solution. VELCO informs us that the correct or least cost transmission solution is also sensitive to future loads.

Q. Please indicate what the coincident peak levels are for the LCSA.

A. VELCO and the petitioners forecasted a peak demand for the LCSA this last winter (2004/05) of 74 MW. This matches the actual coincident peak load for the winter period, which was recently reported to be 74 MW on December 20, 2004. This new peak represented a significant increase for the last reported peak in 2003 of roughly 68 MW.

Q. What are the implications of the existing and forecasted load levels on system reliability?

A. While the forecast of load informs the planning analysis performed by VELCO, the planning analysis and the forecast of load in the LCSA ignore some important features of the existing system and customer opportunities that are embedded neither in the forecast, nor in the planning analysis.

There are a number of reasons to be concerned with the methods used in developing the forecast load. There are also reasons to question whether the opportunities for further constraining growth in the peak, through potential rate design, interruptible loads, and by supplementing local generation with distributed generation have been adequately explored. I am, however, persuaded that the need for the project exists, that the load forecasts used are not unreasonable, and that there is no cause for delay at this time.

There are some offsetting factors, such as local generation that is available to ensure that desired voltages are maintained. According the petitioners, there is more than 12 MW of available generation within the LCSA. The resources identified are hydro resources that typically operate at higher loads in the winter period when peak is likely to occur. Some of the units that are available even include a ponding capability. These units contributed over 4 MW toward the load during the most recent peak. Nevertheless VELCO has chosen to assume no local generation in its planning studies. In light of the production available from these facilities, this seems unduly conservative. I believe that even with further adjustments to the analysis by VELCO, the need is still pressing and is supported by the forecasts and the planning analysis.

Q. Please summarize the forecasts and the methods and approach used to develop the forecast.

A. The forecast in question here is of the coincident peak load for the LCSA. The forecasts of the individual utilities reflect the forecast of peak demand for the individual utilities, but do not reflect the forecast for the areas's coincident peak. The forecasted load "is the assumed coincidental winter peak load for the area." (Exhibit KSM4 - at 2). Nevertheless, the forecast presented was very close to the actual for the most recent winter period.

The petitioners have presented existing load levels and forecasts of load. Because the forecast affects many utilities, the forecast itself is a summation of the forecasted loads of individual utilities identified above. As a consequence, the forecast is created using a variety of analytic methods.

Overall, the petitioners are forecasting peak load growth of about 2.3% on a compound annual basis over the next 10 years. For the current winter 2004/05, the coincident peak was approximately 74 MW. In 2015, they project a peak of 92.6 MW. Most of the growth in the forecast is in just two service territories, the Village of Stowe, and Green Mountain Power. Indeed, the majority (roughly 2/3rds) of the growth in the system is projected to occur in Stowe's 34.5 kV mountain line and the three distribution circuits in GMP's territory serving Waterbury and Waterbury Center.

Most of the forecasts presented use simple time series or simple econometric methods. The practical effect of this is that the utilities have taken historical information, sometimes only four years of data, and extrapolated the pattern over the 20 years of the forecast. The use of time series and simple econometric models can be reasonably accurate for short term forecasts, but are less likely to be so for making long range forecasts. In general, I believe that Vermont utilities should rely on more appropriate methods when looking at decisions with significant investment implications over longer time frames. I won't address the issue further here, since I generally conclude that even as a matter of near term concern, the forecasted load is adequate to demonstrate the need for the project. Over the longer term, other factors, such as population growth, other demographic considerations, underlying economic conditions, end-user trends, appliance saturation, energy efficiency by the efficiency utility, and efficiency

standards can be important drivers of load that are overlooked in most of the forecasting presented to support the petitioners filing. Projections of these other factors can also be challenging, but nevertheless represent an improvement on the simple forecast methods used by many of the Vermont utilities in the LCSA.

Q. What do you conclude from the forecasts of load growth provided?

A. Ms. Moulton's testimony and discovery indicates that we are already confronting major reliability concerns associated with existing loads and that those reliability concerns are severely heightened by even modest load growth. At a coincident peak of approximately 74 MW inside the LCSA, the system is incapable of supporting adequate voltage. We recently hit this level, however, local generation was providing some of the local voltage support so voltage levels should have been maintained at target levels.

At 2008 forecasted levels, loss of VELCO's Berlin 115/34.5 kV transformer would expose the system to voltage collapse. (Moulton pf. at 5). In response to discovery, the data seems to show a sudden and quite significant rise in the coincident system peak from roughly 68 MW in the winter of 2002/03 (from Exhibit KSM-2) to a peak of 74 MW in December of 2004. (See DPS-4, Q. 42 and DPS-9, Q. 16) This sudden change in the peak is troubling. Both size and the timing of the growth is a concern. The three years preceding the recent peak, the peak LCSA load was fairly steady at just below 68 MW. (See, KSM-2 at 7, table 3). Peak growth appears to be suddenly increasing. This is an unexpected change since Stowe Mountain's load is constrained by existing contracts.

Q. Please summarize your conclusions and recommendations concerning the forecast.

A. While I have some misgivings with the forecast methods, recent events support the forecasts of load presented in Exhibit KSM-2 that provides the foundation for the forecast of load, at least over the shorter run. Over time, I believe that the utilities should improve their forecast methods. I also believe there are some promising new avenues for actually managing

the load growth, particularly in relation to larger customers with ability to shift load and rely on distributed generation.

At this time, however, I conclude that the need for the project is imminent and that the forecast of loads presented provide adequate justification for the project. I recommend that the forecast presented by the petitioners be used as the foundation for identifying the appropriate transmission solution.

Conclusions and Summary

Q. Please summarize your testimony and conclusions.

A. I conclude that the forecast of load for the affected region is not unreasonable in light of the patterns of growth for the region that can be expected to continue for some time. I conclude that while there are some cost-effective opportunities for DSM and distributed generation, they are not likely to displace the need. Based on the testimony of various Department technical experts, it is reasonable to conclude that the proposal of the petitioners, as broadly presented, is necessary to continue to meet the need for stable and reliable service to the LCSA region and to meet future growth requirements. The Department is proposing many detailed changes to the proposal to address aesthetic concerns with the proposal. Department witnesses Raphael and Smith identify the areas in which the proposal presents an undue adverse impact and associated remedies. The Department supports the recommendations of Mr. Raphael in all but one instance. The Department therefore recommends that the Board approve the project and issue of Certificate of Public Good that incorporates the changes and recommendations of the Department.

Q.7. Does this conclude your testimony?

A.7. Yes.